J-UCAS *Common Operating System* (*COS*)

Frequently Asked Questions (7/8/05)

What is the role of the Johns Hopkins University Applied Physics Laboratory as an integrator/broker?
A – The integrator-broker plays a variety of roles within the *Common Operating System (COS)* consortium, some of which depend on how effectively its members cooperate, collaborate and integrate their activities. As the integrator-broker, the baseline effort for Johns Hopkins University APL involves facilitating and coordinating the development and testing of the *COS*, encompassing the J-UCAS enterprise architecture, *COS* software development, and the selection of technology contributors to provide requisite functionality for the *COS*. In this role, APL will develop and maintain an executable J-UCAS architectural model, provide available infrastructure to support technology identification and evaluation, and maintain configuration control of Interface Control Documents and *COS* software releases. If it becomes necessary, JHU APL can and will serve as the integrator for the *COS* at the government's direction, completing its development and test activities.

Will the *Common Operating System* require the air vehicle primes to share proprietary information?
A – There is no requirement to share proprietary data. The *Common Operating System* is based on an open system architecture construct that invokes (mostly) commercial standards. The underpinning software infrastructure of the *COS* is government owned. There is no requirement to share proprietary data or information for software applications used in the *COS*. One of APL's roles as the integrator-broker is to protect intellectual property belonging to consortium participants. Vehicle makers can independently make decisions as to what data they wish to share.

Does the Integrator Broker (JHU APL) guide discussions between the primes, Boeing and Northrop Grumman about data sharing?
A – A key Integrator-Broker role is to facilitate collaboration among the members of the consortium to assure the efficient development and maturation of the *COS*. There is no requirement to guide discussions between primes on data sharing, per se, other than common use information required for *COS* integration.

Is APL's work redundant to what the primes are providing?
A – As the integrator-broker, APL is providing a unique capability to the members of the consortium as an "impartial broker" in the resolution of issues and the selection of enabling technologies, free of conflict of interest. APL has no direct role as a *COS* technology contributor nor as a platform integrator, both of which are roles filled by the air vehicle primes.

What is the purpose of the J-UCAS program and how does it fit into the DOD's focus on network centric operations and network centric warfare?
A - The Joint Unmanned Combat Air Systems (J-UCAS) program is a joint Air Force/Navy effort to demonstrate the technical feasibility, military utility and operational value for a networked system of high performance, weaponized unmanned air vehicles to effectively and affordably prosecute 21st century combat missions, including Suppression of Enemy Air Defenses (SEAD), surveillance, and precision strike within the emerging global command and control architecture.

As such, J-UCAS relies on an advanced network-enabled capability to achieve the high levels of collective autonomy, multi-vehicle collaboration, combat responsiveness, and global operation necessary to effectively conduct its spectrum of missions. In its current relatively early state of development and with its focus on operational experimentation, it will serve as an "erector set" for network centric warfare.

What is the benefit of J-UCAS?
A- J-UCAS provides a unique capability for conducting complex, dangerous operations against capable adversaries over deep, denied territory, without putting our human crews at risk. Its unique architecture, involving multiple, capable high performance air vehicles integrated through a *Common Operating System* provides an unprecedented level of flexibility to the warfighter in coping with a vast array of contemporary threats, including the most sophisticated integrated air defense systems. The inherent interoperability of J-UCAS, along with its approach to flexible basing, provides a versatile capability with the promise of significantly reducing acquisition and support costs.

What is the *Common Operating System?*
A – The *Common Operating System* provides the autonomous system 'intelligence' for the overall J-UCAS. The *Common Operating Systems (COS)* enables interoperability among multiple air vehicles and control stations, facilitating the integration of other system components such as sensors, weapons, and communications. The *COS* encompasses the software architecture, algorithms, applications and services that provide command and control, communications management, mission planning, much of the interactive autonomy, the human systems interface and the many other qualities associated with the J-UCAS system.

The J-UCAS system architecture will ensure intra-operability between the internal components of J-UCAS and inter-operability with external elements such as manned aircraft, command and control centers, and space assets.

Is the focus on Common Operating System unusual in a program such as this?
A – The J-UCAS concept is unique among UAV systems primarily in its use of an "operating system" as the central integrating mechanism for the major system components. Traditionally, UAV systems have been designed around their hardware architectures, with federated software components to match the hardware elements. This approach will allow J-UCAS to be intra-operable as well as inter-operable with outside elements of the system.

What is an Integrator/Broker?
A – The integrator-broker role won by the Johns Hopkins APL team is a unique one in systems development, driven by the construct of the *COS* consortium. The two air vehicles primes are collaborating on the common set of system capabilities allocated to the *COS*. This common functionality enables inter-vehicle operations and machine-to-machine interaction necessary for the system to perform effectively in its difficult mission environment. To facilitate collaboration between the air vehicle primes, JHU APL has been engaged as an informed, neutral third party to facilitate, coordinate, and, if necessary, complete the development of the J-UCAS enterprise architecture and the integration of the *COS*. Their level of involvement depends, to a great

extent, on the level of cooperation between the air vehicle primes within the consortium framework.

Why was a Consortium developed?

A. The Consortium was formed to create the most capable and versatile system level functionality possible using "best-of-breed" algorithms and other world class solutions to enable competitive J-UCAS functionality at an affordable cost to the government. The Consortium will make decisions about the *COS* in a collaborative manner, selecting technologies and their providers, resolving conflicts among the participants, and integrating the *COS* as a separate system.

What other roles does JHU-APL, as the Integrator-Broker, have in the Consortium?

A. JHU-APL will act as the configuration manager for the *COS* development effort; providing an electronic, WEB-Based collaborative environment; administering and coordinating technology competitions; administering certain Technology Contributor subcontracts; and remaining free from conflicts of interest to fulfill its role as the government's trusted agent.

What are Boeing and Northrop Grumman's roles in the Consortium?

A. Boeing and Northrop Grumman are initial members of the consortium, with primary roles as *COS* technology developers, and integrators of COS into their respective platforms

What are Technology Contributors and their relationship to the *COS* Consortium?

A. Technology Contributors (TCs) contribute algorithms, software functionality, and technology solutions to the *COS* as authorized by the Consortium Management Council (CMC). The Consortium's process for selecting TCs is coordinated by the Integrator-Broker. Furthermore a team consisting of the Integrator-Broker and the primes evaluates the subject technology. Finally, a Procurement Review Board made up of Consortium Members convenes to make the final selection decision. The TCs are not a party to the Articles of Collaboration of the *COS* Consortium and are not Consortium members. Rather, they are subcontractors to the Integrator/Broker.